**REMARKS**

This Amendment cancels claims 14-25 and makes an editorial change to claims 26 and 27. More particularly, "recombinant Dpr/Dps protein particle" has been changed to -- recombinant Dpr protein particle or recombinant Dps protein particle --. One of ordinary skill in the art would understand "Dpr/Dps" meant Dpr or Dps in view of page 1, line 19 to page 2, line 2 and page 5, lines 8-12 of the specification. Claims 26-38 are pending.

Entry of this Amendment is respectfully requested, as it is believed (1) to place the application in condition for allowance, (2) not to raise any new issue or require further search, (3) to be directly responsive to the Official Action, and (4) to place the application in even better form for appeal, should such appeal be necessary. The cancellation of withdrawn claims 14-25 cannot raise a new issue or require further search. The amendment of claims 26 and 27 is merely editorial, and overcomes the written description rejection discussed below.

The 35 U.S.C. § 112, second paragraph, rejection of claims 26-38 is traversed. One of ordinary skill in the art would understand "genetically fused binding moiety" to mean a binding moiety which is produced by gene fusion. The person of ordinary skill would further understand that genes which are genetically fused would

encode a fusion protein[1]. Reconsideration and withdrawal of the indefiniteness rejection of claims 26-38 are earnestly requested.

This Amendment overcomes the 35 U.S.C. § 112, first paragraph, rejection of claims 26-38 for failure to comply with the written description requirement. More particularly, claims 26 and 27 have been editorially amended to make clear the previously-claimed recombinant Dpr/Dps protein particle is either a recombinant Dpr protein particle or a recombinant Dps protein particle. Both Dps and Dpr protein particles are disclosed beginning at page 19, line 1 of the specification as originally filed. One of ordinary skill in the art would understand the applicants had possession of the presently-claimed invention as of the application's filing date.

The remaining ground for rejection under 35 U.S.C. § 112, first paragraph, is without merit. As noted above, a person skilled in the art would easily recognize that the application as

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[1]Fusion protein. A polypeptide translated from a chimeric gene. The different genes are joined so that their coding sequences are in the same reading frame, and the resulting construct is transcribed and translated as a single gene, producing a single protein. These are used for a number of purposes, including: 1. To add an affinity tag to a protein; 2. To produce a protein with the combined characteristics of two natural proteins; 3. To produce a protein where two different activities are physically linked. Zaid et al., Glossary of Biotechnology for Food and Agriculture - A Revised and Augmented Edition of the Glossary of Biotechnology and Genetic Engineering (2001), available at **www.fao.org/docrep/004/y2775e/y2775e00.htm**.

a whole and especially the examples all relate to incorporating binding moieties into subunits of apoferritin (and apoferritin-like particles such as Dpr and Dps protein particles) by genetic fusion. All the binding moieties of the disclosed embodiments of the invention are genetically fused into subunits of the apoferritin nanoparticle. Thus, Examples 8-11 illustrate the production of genetically fused subunits having genes expressing protein G (Example 8), scFv fragment (Example 9), calmoudulin binding peptide (Example 10) and biotinylated peptide (Example 11). Ferritin-based nanoparticles expressing these binding moieties on their surface were prepared in Example 1. One of ordinary skill in the art would recognize the inventors had possession of the presently-claimed nanoparticle as of the filing date of this application.

Reconsideration and withdrawal of the 35 U.S.C. § 112, first paragraph, rejection of claims 26-38 are respectfully requested.

The 35 U.S.C. § 102(b) rejection of claims 26, 27, 29 and 36-38 over U.S. Patent No. 4,959,306 to Kameda et al. is traversed. The claimed nanoparticle is a recombinant apoferritin particle (or a recombinant Dpr protein particle or recombinant Dps protein particle) in which first and second binding moieties are genetically fused to protein and/or peptide subunits. Importantly, genetic fusion produces a continuous polypeptide chain of the

subunit in which the first and/or second binding moieties are incorporated. Accordingly, all corresponding subunits of the apoferritin where a first and/or second binding moiety has been genetically fused are identical to one another, i.e. the binding moieties are in exactly the same stretches of the polypeptide chain.

Kameda et al. fails to disclose the claimed recombinant nanoparticle. Instead, Kameda et al. discloses ferritin particles having chemically bound binding moieties, e.g. a polypeptide of a ferritin subunit (see Fig 1B and Example 1 of Kameda et al.). Importantly, the binding moieties of the subunits of the ferritin of Kameda et al. are distributed to random locations of the polypeptide chain susceptible to attachment of the chemical linker, which results in great variation of the nanoparticles of Kameda et al. Consequently, it is impossible to prepare uniform nanoparticles, consisting of identical subunits, using the Kameda et al. method.

In short, Kameda et al.'s chemically synthesized particle is not the same particle as the claimed recombinant nanoparticle produced by genetic fusion. Reconsideration and withdrawal of the anticipation rejection of claims 26, 27, 29 and 36-38 over Kameda et al. are respectfully requested.

The 35 U.S.C. § 103(a) rejection of claim 30 over Kameda et al. in view of U.S. Patent No. 6,713,274 to Bertozzi et al. is traversed. As discussed above, the claimed nanoparticle is a recombinant apoferritin particle, a recombinant Dpr protein particle or a recombinant Dps protein particle.

The cited combination of references fails to raise a prima facie case of obviousness against the claimed nanoparticle because neither reference discloses or suggests a recombinant apoferritin particle, a recombinant Dpr protein particle or a recombinant Dps protein particle. Reconsideration and withdrawal of the obviousness rejection of claim 30 over Kameda et al. in view of Bertozzi et al. are earnestly requested.

The 35 U.S.C. § 103(a) rejection of claim 31 over Kameda et al. in view of U.S. Patent Publication 2003/0124586 to Griffiths et al. is traversed. The claimed nanoparticle is a recombinant apoferritin particle, a recombinant Dpr protein particle or a recombinant Dps protein particle.

The cited combination of references fails to raise a prima facie case of obviousness against the claimed nanoparticle because neither reference discloses or suggests a recombinant apoferritin particle, a recombinant Dpr protein particle or a recombinant Dps

protein particle. Reconsideration and withdrawal of the obviousness rejection of claim 31 are respectfully requested.

The 35 U.S.C. § 103(a) rejection of claims 28 and 32 over Kameda et al. in view of U.S. Patent No. 6,599,331 to Chandler et al. is traversed. The claimed nanoparticle is a recombinant apoferritin particle, a recombinant Dpr protein particle or a recombinant Dps protein particle.

The cited combination of references fails to raise a prima facie case of obviousness against the claimed nanoparticle because neither reference discloses or suggests a recombinant apoferritin particle, a recombinant Dpr protein particle or a recombinant Dps protein particle. Reconsideration and withdrawal of the obviousness rejection of claims 28 and 32 are respectfully requested.

The 35 U.S.C. § 103(a) rejection of claims 33, 35 and 36 over Kameda et al. in view of U.S. Patent No. 6,537,760 to Bergmann et al. is traversed. The claimed nanoparticle is a recombinant apoferritin particle, a recombinant Dpr protein particle or a recombinant Dps protein particle.

The cited combination of references fails to raise a prima facie case of obviousness against the claimed nanoparticle because neither reference discloses or suggests a recombinant apoferritin

particle, a recombinant Dpr protein particle or a recombinant Dps protein particle. Reconsideration and withdrawal of the obviousness rejection of claims 33, 35 and 36 over Kameda et al. in view of Bergmann et al. are respectfully requested.

The 35 U.S.C. § 103(a) rejection of claim 34 over Kameda et al. in view of U.S. Patent Publication No. US 2003/0077578 to Oon et al. is traversed. The claimed nanoparticle is a recombinant apoferritin particle, a recombinant Dpr protein particle or a recombinant Dps protein particle.

The cited combination of references fails to raise a prima facie case of obviousness against the claimed nanoparticle because neither reference discloses or suggests a recombinant apoferritin particle, a recombinant Dpr protein particle or a recombinant Dps protein particle. Reconsideration and withdrawal of the obviousness rejection of claim 34 are respectfully requested.

It is believed this application is in condition for allowance. Reconsideration and withdrawal of all rejections of claims 26-38, and issuance of a Notice of Allowance directed to these claims, are earnestly requested. The Examiner is urged to telephone the undersigned should she believe any further action is required for allowance.

It is not believed any fee is required for entry and consideration of this Amendment. Nevertheless, the Commissioner is authorized to charge Deposit Account No. 50-1258 in the amount of any such required fee.

Respectfully submitted,

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